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UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/922,006	08/03/2001	Azzedine Touzni	1043.002	6899

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EXAMINER
WANG, TED M

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/922,006	TOUZNI ET. AL.
	Examiner	Art Unit	
	Ted M Wang	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *8/3/2001*.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-41* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-3,10,15-26,28 and 32-41* is/are rejected.

7) ☒ Claim(s) *4-9,11-14,27 and 29-31* is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *03 August 2001* is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a) ☐ All   b) ☐ Some * c) ☐ None of:

   1. ☐ Certified copies of the priority documents have been received.

   2. ☐ Certified copies of the priority documents have been received in Application No. _____.

   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/27/2001*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____ .

DETAILED ACTION

Drawings

1.   The drawings are objected to because

□ Formal drawings Figs.1-11 are required.

A proposed drawing correction or corrected drawings are required in reply to the Office

action to avoid abandonment of the application. The objection to the drawings will not

be held in abeyance.

Claim Objections

2.   Claims 1-40 are objected to because of the following informalities:

□ In claim 1 line 4 and claim 24 lines 4-5, insert -- (SA) after -- "single-axis",

respectively.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed
> or described as set forth in section 102 of this title, if the differences between the
> subject matter sought to be patented and the prior art are such that the subject
> matter as a whole would have been obvious at the time the invention was made
> to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was
> made.

4.   Claims 1-3, 10, 18, 24-26, 28, and 42 are rejected under 35 U.S.C. 103(a) as

being unpatentable over the admitted prior art of the instant application in view of Filho

et al. (new bussgang method for blind equalization Acoustics, Speech, and Signal

Processing, 1997. ICASSP-97, 1997 IEEE International Conference on, Volume: 3, 21-

24 April 1997, Pages: 2269 - 2272 vol.3)

- With regard claim 1, the admitted prior art of the instant application teaches

    a) generating, from the signal, an estimate of an angle between the carrier and a

    locally generated reference (Fig.1 elements 122-126 and page 3 line 21 – page 5

    line 19) based on a stochastic gradient of a single-axis cost function (Fig.1

    elements 122-123, page 5 lines 8-19, and page 8 lines 3-15); and

    b) adjusting at least one of the frequency and phase of the demodulated signal

    based on the angle such that the magnitude of the angle is driven toward a

    predetermined value (page 3 line 21 – page 4 line 27).

    The admitted prior art of the instant application discloses all subject matter as

    described above except for specifically teaching the cost function being a

    Bussgang-class cost function.

    However, Filho et al. teaches the cost function being a Bussgang-class cost

    function (page 2269 section 1 Introduction lines 1-5, Page 2270 section 2 lines 1-

    27).

    It is desirable to including a Bussgang-class cost function in order to improve the

    blind equalization algorithm's complicity and convergence properties. Therefore,

    It would have been obvious to one of ordinary skill in the art at the time of the

    invention was made to include the method as taught by Filho et al. in which, the

    cost function being a Bussgang-class cost function, into the equalization process

of the admitted prior art of the instant application so as to improve the blind equalization algorithm's complicity and convergence properties.

❑ With regard claim 2, the admitted prior art of the instant application further teaches:

a1) calculating a SA cost function error term based on the demodulated signal (Fig.1 elements 122 and 123 and page 8 lines 3-15);

a2) forming an approximation of a derivative of the demodulated signal with respect to the angle (Fig.1 elements 122 and 123 and page 8 lines 3-15); and

a3) combining the SA cost function error term (Fig.1 element 122 input COST ERROR TERM and page 3 line 21 – page 4 line 2) with the approximation to form a phase error (Fig.1 element 122 output SAMPLING PHASE ERROR and page 3 line 21 – page 4 line 2); and

a4) generating the angle from the phase error (Fig.1 element 121 and page 3 line 21 – page 4 line 2).

❑ With regard claim 3, the admitted prior art of the instant application further teaches that the single-axis cost function is a single-axis constant modulus criterion J_{CM} (page 6 line 24 – page 8 line 15).

❑ With regard claim 10, the admitted prior art of the instant application further teaches for step b), adjusting the locally generated reference includes the step of shifting, in frequency, the demodulated signal substantially to baseband (page 3 line 21 – page 4 line 12).

- With regard claim 18, the admitted prior art of the instant application further teaches wherein step a) generates the estimate of the angle based on both the equalized, demodulated signal and on the decision for the data of the equalized, demodulated signal (Fig.1 element 150 and page 4 lines 3-11).

- With regard claim 24, which is an apparatus claim related to claim 1, all limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.

- With regard claim 25, which is an apparatus claim related to claim 2, all limitation is contained in claim 2. The explanation of all the limitation is already addressed in the above paragraph.

- With regard claim 26, which is an apparatus claim related to claim 3, all limitation is contained in claim 3. The explanation of all the limitation is already addressed in the above paragraph.

- With regard claim 28, which is an apparatus claim related to claim 10, all limitation is contained in claim 10. The explanation of all the limitation is already addressed in the above paragraph.

- With regard claim 42, all limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.

5.   Claims 15-17, 19-23, and 32-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art of the instant application and Filho et al. (new bussgang method for blind equalization Acoustics, Speech, and Signal Processing, 1997. ICASSP-97, 1997 IEEE International Conference on, Volume: 3, 21-24 April

1997, Pages: 2269 - 2272 vol.3) as applied to claim 1 above, and further in view of Nobakht et al. (US 5,692,011).

☐ With regard claim 15, the admitted prior art of the instant application and Filho et al. teach all of the subject matter as described above except for specifically teaching the steps of applying equalization to the demodulated signal with forward and/or feedback filters.

However, Nobakht et al. teaches the steps of applying equalization to the demodulated signal with forward and/or feedback filters (Fig.3 elements 301 and 305, Figs.4-5, Fig.6 elements 601 and 605, column 9 lines 22-47, and column 12 lines 4-36).

It is desirable to including the steps of applying equalization to the demodulated signal with forward and/or feedback filters for a nonlinear equalization. The reason for this is if a Decision Feedback Equalization (DFE) having a feedback filter and a feed forward filter is used with the Bussgang or other algorithm in a receiver for carrier and frequency detection, the postcursor inter-symbol interference (ISI) can be removed (page 9 lines 22-30). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the method as taught by Nobakht et al. in which, including the steps of applying equalization to the demodulated signal with forward and/or feedback filters, into the equalization process of the admitted prior art of the instant application and Filho so as to cancel the postcursor inter-symbol interference.

- ❑ With regard claim 16, the admitted prior art of the instant application further teaches for step a) generates the estimate of the angle based on the equalized, demodulated signal (Fig.1 element 123 and page 4 lines 3-12).

- ❑ With regard claim 17, the admitted prior art of the instant application further teaches the step of generating a decision for the data of the equalized, demodulated signal, and wherein step a) generates the estimate of the angle based on the decision for the data of the equalized, demodulated signal (Fig.1 element 150 and page 4 lines 3-11).

- ❑ With regard claim 19, all limitation is contained in claim 15. The explanation of all the limitation is already addressed in the above paragraph.

- ❑ With regard claim 20, the admitted prior art of the instant application further teaches wherein step a) generates the angle based on a SA cost function error term (Fig.1 element 123 output and page 8 lines 1-15) that is generated during equalizer adaptation as tap-coefficients are updated by applying equalization to the demodulated signal (page 6 lines 18-30).

- ❑ With regard claim 21, all limitation is contained in claims 15 and 10. The explanation of all the limitation is already addressed in the above paragraph.

- ❑ With regard claim 22, the admitted prior art of the instant application further teaches wherein, for step a), the data-modulated signal is the carrier modulated by the data in accordance with a vestigial sideband (VSB) format (page 2 lines 20-25 and page 3 lines 4-14).

❏ With regard claim 23, all limitation is contained in claim 21. The explanation of all the limitation is already addressed in the above paragraph.

❏ With regard claim 32, which is an apparatus claim related to claim 15, all limitation is contained in claim 15. The explanation of all the limitation is already addressed in the above paragraph.

❏ With regard claim 33, which is an apparatus claim related to claim 16, all limitation is contained in claim 16. The explanation of all the limitation is already addressed in the above paragraph.

❏ With regard claim 34, the admitted prior art of the instant application further teaches a decision circuit to generate a decision for the data of the equalized, demodulated signal (Fig.1 element 150 and page 4 lines 3-11), and wherein the carrier tracking loop generates the estimate of the angle based on the decision for the data of the equalized, demodulated signal (Fig.1 elements 124-126)

❏ With regard claim 35, which is an apparatus claim related to claims 15 and 18, all limitation is contained in claims 15 and 18. The explanation of all the limitation is already addressed in the above paragraph.

❏ With regard claim 36, which is an apparatus claim related to claim 19, all limitation is contained in claim 19. The explanation of all the limitation is already addressed in the above paragraph.

❏ With regard claim 37, which is an apparatus claim related to claim 20, all limitation is contained in claim 20. The explanation of all the limitation is already addressed in the above paragraph.

□ With regard claim 38, which is an apparatus claim related to claim 21, all

limitation is contained in claim 21. The explanation of all the limitation is already

addressed in the above paragraph.

□ With regard claim 39, which is an apparatus claim related to claim 22, all

limitation is contained in claim 22. The explanation of all the limitation is already

addressed in the above paragraph.

□ With regard claim 40, which is an apparatus claim related to claim 23, all

limitation is contained in claim 23. The explanation of all the limitation is already

addressed in the above paragraph.

6.   Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over the

admitted prior art of the instant application and Filho et al. (new bussgang method for

blind equalization Acoustics, Speech, and Signal Processing, 1997. ICASSP-97, 1997

IEEE International Conference on, Volume: 3, 21-24 April 1997, Pages: 2269 - 2272

vol.3) as applied to claim 1 above, and further in view of Langberg et al. (US 5,852,630).

□ With regard claim 41, the admitted prior art of the instant application and Filho et

al. discloses all of the subject matter as described above except for a computer-

readable medium having stored thereon a plurality of instructions.

However, Langberg et al. teaches that the method and apparatus for a

transceiver warm start activation procedure with precoding can be implemented

in software stored in a computer-readable medium. The computer-readable

medium is an electronic, magnetic, optical, or other physical device or means

that can be contain or store a computer program for use by or in connection with

a computer-related system or method (column 3, lines 51-65). One skilled in the art would have clearly recognized that the method of "the admitted prior art of the instant application and Filho" would have been implemented in a software. The implemented software would perform same function of the hardware for less expense, adaptability, and flexibility. Therefore, it would have been obvious to have used the software in "the admitted prior art of the instant application" as taught by Langberg et al. in order to reduce cost and improve the adaptability and flexibility of the communication system.

Allowable Subject Matter

7.   Claims 4-9, 11-14, 27, and 29-31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims rewritten to overcome the objection(s) set forth in this Office action.

Conclusion

8.   Reference(s) US 6, 418,164 and US 6,426,972 are cited because they are put pertinent to the blind equalization with Gussgang algorithm. However, none of references teach detailed connection as recited in claim.
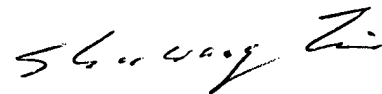
9.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M. Wang whose telephone number is 571-272-3053. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ted M Wang
Examiner
Art Unit 2634

Ted M. Wang

SHUWANG LIU
PRIMARY EXAMINER